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Electricity on the Farm

A Monthly Magazine for the Progressive Rural Family

February
1930

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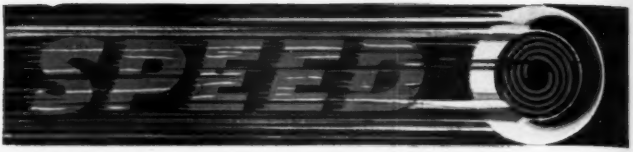

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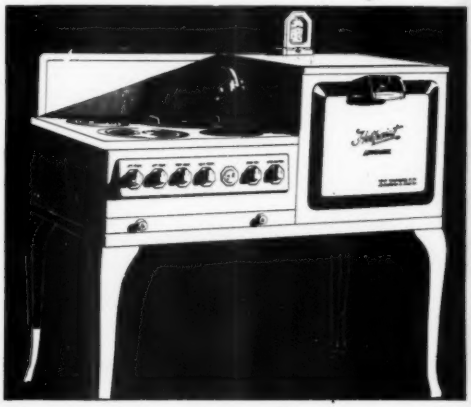
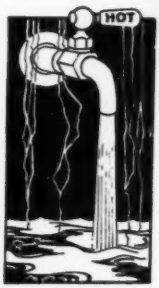


There are many sizes and types of Hotpoint automatic electric ranges, at prices to meet every requirement—including models with auxiliary kitchen heaters for coal or wood.



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Electricity on the Farm

Vol. 3 FEBRUARY, 1930 No. 2

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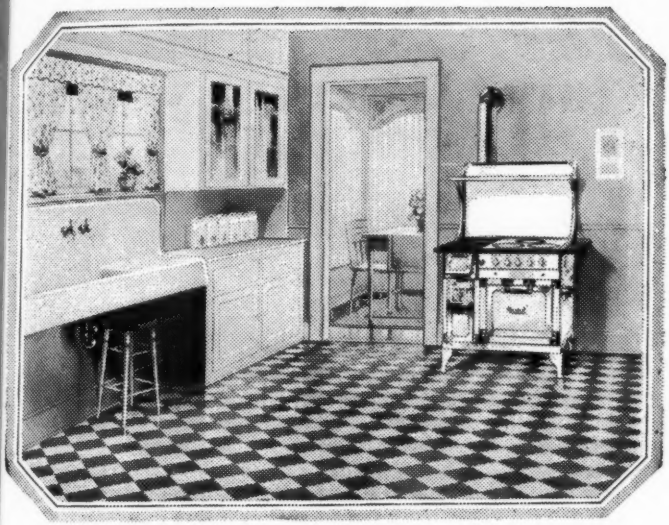

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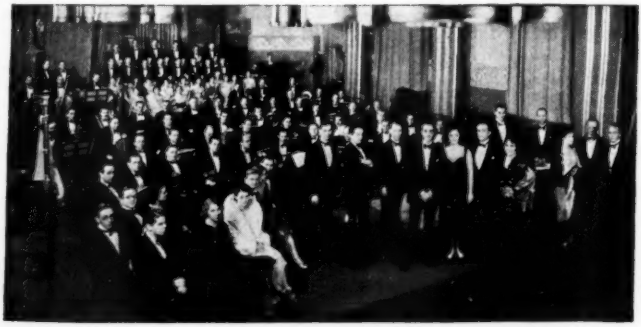

. . . The Studio Cast of a "Westinghouse Salute"

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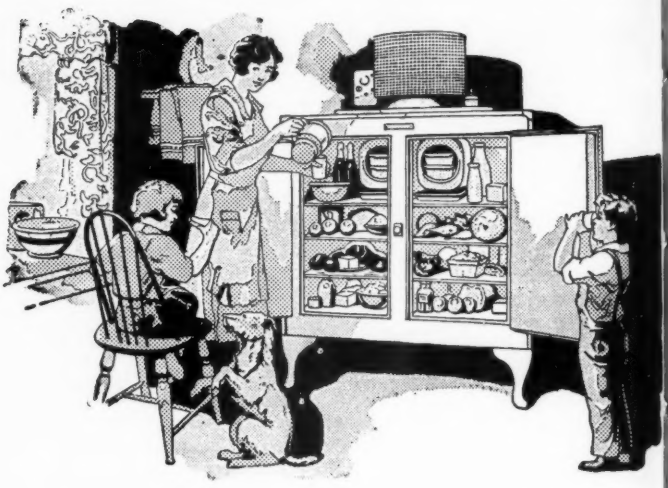
SALUTES THE AGRICULTURAL INDUSTRY



The Vanishing Ice House

Soon the winter task of cutting ice will be a thing of the past—and with it the unnecessary spoilage of food. For now, electricity fills every refrigeration need on the electrified farm.

The General Electric refrigerator is entirely automatic. It requires no attention, no oiling, and its constant, correct temperature safeguards food and keeps it fresh and wholesome. This is the latest electrical boon, which with G-E MAZDA lamps, G-E motors, and other General Electric products, releases men and women on the farm from age-old burdens and drudgery.

If you are located on or near an electric power line, ask your power company for complete information concerning the possible uses of electricity on your farm.

Tune in on the General Electric Special Weekly Farm Program on WGY (Schenectady). In addition, join us in the "General Electric Hour" broadcast every Saturday at 9 P.M., Eastern Standard Time, on a nation-wide N.B.C. network.

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Electricity on the Farm

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Checking the Weeds

There's only one sure way of controlling weed trouble: properly cultivating the ground, and planting only clean seed. To check the ravages of weeds after the crops are growing, were it possible, would be expensive.

In an average grain crop ten per cent of the crop may be considered as weeds. If such a crop is used for seed, and planted without cleaning, the condition will certainly be much more aggravated the following year. Then, too, considered this: where such seed is planted, ten per cent of all of the labor from the planting of the seed to the threshing of the crop is wasted.

Cleaning seeds by modern methods is a simple operation, requiring very little manual labor where electric service is available, and using a negligible quantity of current. Certainly there is no more profitable investment in any farm operation that the proper cleaning of seeds before planting. Modern machines not only remove the weed seed but also chaff and other waste materials which find their way into the grain bin. Furthermore as weed seed contains considerably more moisture than does grain, grain storage is far more apt to become mouldy when there is a large proportion of weed seed present than when it is clean. For this reason the use of modern power fanning mills represents one of the most beneficial and economical practices on the up-to-date farm.

An Easy Way To Make Cottage Cheese

Western Dairy Farm Gets Revenue from Skim Milk by Making Cottage Cheese

By J. C. SCOTT

DODDS BROTHERS, owners of the Marymoore Dairy Farm, Kirkland, Wash., at times have more skim milk than is needed on the farm and wanted to turn it into money by selling cottage cheese.

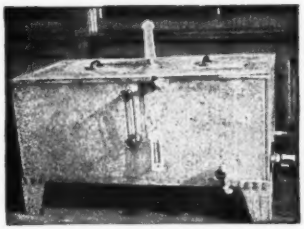
They had the market, but were short on time. They wanted to make good cheese and make it easily—some economical method that demanded little time and attention.

Here is the problem as outlined by Dodd Brothers.

"We want to heat 50 gallons of skim milk to a temperature of 70 degrees F. and hold it there for about 12 hours or more. The condition of the curd will determine the time.

"When ready the curd will be cut, the whey drained off, and the temperature of the cheese immediately raised to 140 degrees F. and kept there for about half an hour, or until the right solidity is obtained."

This problem was given to a local electrical engineering organization working in cooperation with the farm electrification service of the Puget Sound Power & Light Company, and as a result Dodds Brothers are now making cheese with electricity.



This is the machine that Dodd Brothers use for making cottage cheese.

"Because it controls the temperature so well," says Mr. Dodds, "it is easy to make good cheese with this electric machine."

This cottage cheese machine is in reality a vat within a vat. The lower vat holds 50 gallons of water and the upper one 50 gallons of skim milk.

To each compartment is attached a thermometer, and to the lower vat a water gauge.

A 1000 watt heater regulated by a thermostat keeps the water at 70 degrees. When higher temperature is desired, the 1000 watt heater is turned off and a 2000 watt heater is turned on. This part of the heater is controlled by another thermostat which holds the temperature at 140 degrees F.

The temperature of the water regulates the temperature of the milk or cheese.

The outside dimensions of the vat are 54 inches long, 26 inches wide, and 31 inches high. It is made of No. 20 gauge galvanized iron on steel angle frame.

The outer vat is well insulated with one and one-half inches of good heat-insulating material and lined with copper.

The inner vat is made of tinned copper.

The entire outfit on 4-inch legs weighs 200 pounds.

Hatching and Brooding by Wire

By TRUMAN E. HIENTON
Agr'l Engr. Dept., Purdue Univ.

FOSTER mothers operated by electric wires are indeed rare objects, but the electric incubator and electric brooder are no longer classed as oddities for they are now commonly used in many sections of the United States where electric service is available. The incubator and brooder have long been called the foster mothers of baby chicks but with electric current adapted to operate them, it may be said that electricity is the greatest foster mother of them all.

TRUMAN E. HIENTON

Just as the incubator and brooder have been slowly depriving the hen of her time-honored duty of hatching and rearing her yearly brood, so has electric current been gradually supplanting other sources of energy in the heating and operation of both incubators and brooders.

This gradual change to the use of electric current for heating incubators and brooders is due to a number of factors. The first of these and perhaps the most important has been the development of suitable electric equipment for hatching and brooding purposes. Another equally important factor, particularly with incubators, has been the pronounced success of the equipment in operation. A third factor responsible for the prompt acceptance of electric incubators and brooders has been the elimination of labor required in firing stoves, carrying of ashes, re-filling of lamps, trimming wicks and other similar work.

The gradual extension of electric lines into rural districts and to farms is also a decidedly important factor in the extension of the use of electric incubators and brooders. The development of satisfactory electric incubators and brooders has taken place very largely in the past ten years. This is especially true of the larger incubators which were primarily designed for the commercial hatcheryman, or poultryman who does extensive hatching. With the development of the cabinet type of large incubator should be associated directly the use of electric current for operation of the fans which are so necessary to the success of this type of incubator. Kerosene or coal may be used as a source of heat for the cabinet type machine, but electric energy must be used for operation of the fans. One firm which has had rather wide distribution of its incubators manufactures machines which can be heated only by electric energy. Other well-known firms are now prepared to furnish electric heaters for their machines even though they are equipped for use with other fuel.

Satisfactory Results from Small Incubators

The smaller sizes of electric incubators, while they probably have not passed through the decided changes of the larger machines, have been developed to the stage where they usually give very satisfactory results.

The electric brooder particularly has been passing through several changes in recent years. Consider-

Making good use of spare basement space for hatching eggs in an electrical incubator

able attention has been paid to the design of brooders with regard to ventilation problems, size of heating elements required and proper distribution of heat under the brooder. As a result many electric brooders have been put into use by poultry raisers, particularly on the Pacific coast, with a good sized number through the Middle West.

The success obtained by using electric incubators has been very general, while the use of electric brooders has had its greatest success in the poultry sections of the West coast. Hatcherymen have found electrically heated and operated Mammoth incubators to be very successful. This has been noticeably true in Indiana, where many hatcherymen are using only electrically heated machines. One hatcheryman now operates sixteen 15,000-egg machines in his three hatcheries in the state. A further evidence of their success in use is shown by the use of electrically

Fifty-five thousand eggs are incubated in these four electric incubators in a hatchery at Lafayette, Ind.

heated incubators in a hatchery located in the Petaluma district in California, said to be the largest hatchery in the world with its 900,000-egg capacity. This furnishes a definite indication of the success of electric incubators in the opinion of commercial hatcherymen. Another reason for their success from the standpoint of the hatcheryman is reported by Kansas State Agricultural College (Eng. Exp. Station Bulletin No. 21). Results reported show that the cost of energy for operating two Mammoth incubators is essentially the same with kerosene and electricity on the basis of local costs.

Ahead of Oil Incubators

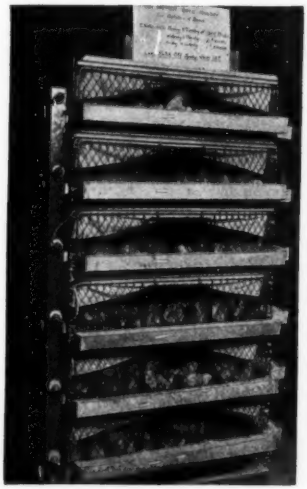
The smaller electric incubators have generally given successful results and in many cases better hatches than with oil heated machines. Many oil heated incubators are converted into electric machines by the installation of an electric heating element and a thermostat. One manufacturer of electric incubators in Indiana reported that in 1927 he had sold a considerably greater number of heating units for converting other types into electric than he had new machines. This would tend to indicate the success of this practice of converting into electrically heated machines those using other types of heating.

A Specific Example

One outstanding example of the success in using electric brooders is that of western Washington, where it is reported that from one-quarter to one-half of the chicks were brooded in 1928 by the use of electric brooders. The successful use of electric brooders in the Middle West has in general been confined to the months of the brooding season beginning with April, except where artificial heat was provided in the room in which the brooder was located. However, in an experiment carried on at the poultry plant of the Purdue University Agricultural Experiment Station in February and March, 1928, chicks were raised in colony brooder houses with no artificial heat in the houses other than that provided by the electric brooders themselves.

To insure the successful use of electric incubators and brooders a device shou'd be provided to warn the operator when electric service to the machine has been interrupted or when the temperature has dropped below a given point. The latter is the more desirable of the two types for some mishap may interfere with the satisfactory operation of either incubator or brooder even though the electric service is in good order. Such accidents as a "short" in the wiring to the machine or in the machine itself or failure of contact points to close properly through faulty adjustment or explosion of the wafer would be readily detected through the use of a temperature alarm.

The labor connected with the firing of coal-heated incubators or brooder stoves together with that of cleaning out and carrying away ashes is eliminated by the use of electrically heated incubators



Battery electric brooder used for displaying day-old chicks for sale, or for indoor brooding.

and brooders. In like manner, the care required in filling lamps, trimming wicks and adjusting flames of oil-heated incubators and brooders is eliminated when they are replaced by electrically heated machines. This item of saving labor is responsible for changing to electrical equipment by farmers and hatcherymen even though prevailing rates for electric current are so high that cost of operating them is increased.

Reduces Fire Risk

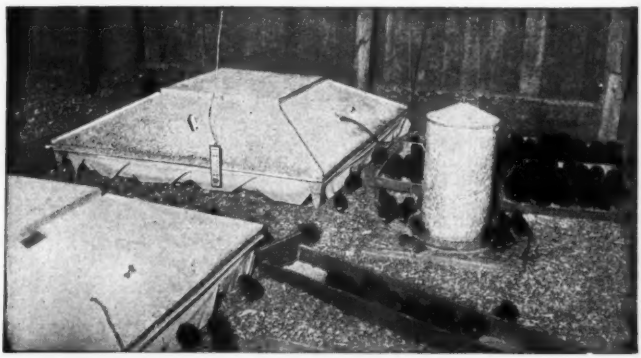
Lessening of fire risk has been responsible for changing from oil or coal heated incubator or brooders to electrically heated ones or for converting those machines to electric operation where practical. A striking illustration of this occurred on the farm of Walter Yundt of Sedalia, Indiana, in April, 1928. In March of last year, Mr. Yundt had purchased 300 day-old chicks and started them in his brooder house under a hard coal heated brooder. One Sunday morning in April after he had taken his family to church, a neighbor found his brooder house in flames, and arrived in time to save over a hundred of the chicks. Following this incident, Mr. Yundt built a new brooder house and bought an electric brooder with which he raised 174 out of 200 chicks at an expenditure of 198 kw. hours. The chicks were started April 13 and brooded until the middle of June.

Mr. Yundt's first experience with electric brooding leads him to believe that the cost of energy for electric brooding will be less than with coal during April, May and June. He ordinarily uses 2500 lbs. of hard coal costing him $18.75, which is over twice the cost of the electric energy used by his electric brooder in 1928. His reason for this big saving is that on warm days when the chickens are outside the brooder house the current to the electric brooder may be turned off while it is necessary to keep the coal fire burning during the day or rekindle it again in the evening. During the coming season he expects to start using his electric brooder in February.

The Battery Brooder

Another type of electric brooder which has been adopted for use by hatcheries because of its low fire hazard and because of its ease of operation is the display or battery brooder. This is essentially a group of flat-top electric brooders which have been piled one above the other. Each has its own thermostat and heating element and the group of units is used primarily by hatcherymen for dis-

(*Continued on page* 48)



Interior of brooder house with electric brooder in operation on the farm of Chas. Meharry near Attica, Ind.

Making More Money *from Milk*

By E. R. MEACHAM

THE market for pure milk is not far away in some distant city. The demand for it exists in the mind of every mother who wants clean, safe milk for her baby, and mothers like that are everywhere. Small cities and even villages throughout the entire country are meeting this demand by passing pure milk ordinances which recognize the wide variation in the quality of milk, set up standard grades, and regulate the conditions under which they must be produced.

To help make these standards uniform, the United States Department of Agriculture has drawn up a model milk ordinance which seems to meet the needs of the smaller cities and is rapidly being adopted in many sections.

Model Milk Ordinance Brings Action

In 1926 Janesville, a Wisconsin town of 21,000, passed such an ordinance. There was an immediate demand on the local milk dealer for Grade A milk. To secure it, he turned at once to L. A. Markham, a farmer already supplying him with milk, for he knew that he was able and would be very willing to meet the new requirements.

Out at his Rulondale Farm, Mr. Markham was already practicing sanitary methods and taking as good care of his milk as though it had to pass some rigid inspection.

He had purchased this farm in 1923 and he was attempting to make it meet his ideals in every respect, including profitable operation. It was the pride of a good workman in doing a job right, and the responsibility of a good citizen conscious of the importance of clean, wholesome milk for the community he served, that made him painstaking in his methods, even before these extra touches had a money value.

Perfect cleanliness in all the steps of production is the secret of clean milk—after healthy cows, of course. Keeping even clean milk palatable and low in bacteria till it reaches somebody's back porch demands still more, but I would like to let Mr. Markham tell in his own words the story of how he produces Grade A milk on an ordinary farm.

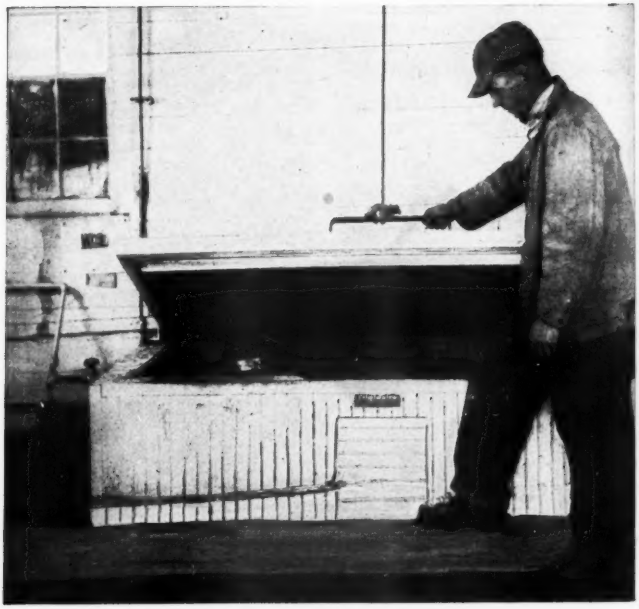
"In 1923, when I got this farm, it was pretty badly run down. The barns were bad, the house was tumbling to pieces, all of the buildings were down at the heel. The soil was run down, too. We had to make over practically everything. At the barn doors, I built cement platforms so the cattle would have a clean run into the barn. I put in new stanchions where the horses had stood, and white-washed everything to set a new standard of cleanliness.

"Of course, we had to include in all of our plans the reduction of the cost of producing the milk. That led us to buy a motor-driven milking machine in 1924. It helped us improve the quality of the milk right from the start. It—"

"Wait a minute," I interrupted.

Rulondale is attractive as well as practical.

The barns are substantial, but unpretentious



Here's Mr. Markham's milk cooling tank.

"That is one of the things we want to know in detail. Lots of people are curious about whether the milking machine does help the quality of the milk."

Mr. Markham smiled.

"With the machine we can standardize our milking practices and keep a uniform quality. When we had three or four men behind that string of cows, each man milked in his own way in spite of our efforts. Now, with one man in charge of the herd, and a boy for part of the milking, we have set up a regular routine that they follow. First, the cows are cleaned off. The tails and udders are brushed and the udders wiped off with a cloth before the machine is put on."

"Do the men use a wet cloth?" I asked.

"Only when the cows are actually muddy," returned Mr. Markham. "Part of our pasture is low, and in the spring or during a rainy spell the cows sometimes get pretty dirty. When they do, we wipe the udders off with a wet cloth. This practice gives us a much lower sediment test than we got with hand milking.

Milking Machine Gets Special Care

"Then the milking machine itself has special care. We have a definite routine for it, and following that routine rigidly helps us keep the milk clean."

"After the night milking," Mr. Markham went on, "the herdsman, Mr. Veek, takes the milking machine apart. The pails are washed out, the teat cups and rubbers are washed and brushed, then left in a sterilizing solution over night. After the morning milking, he takes all the equipment and washes it in cold water. Then he takes it to a basement washroom fixed up in his house. Here all of the machine is washed again in luke warm water, then sterilized with boiling water. After that, the rubbers are left in sterilizing solution for the day."

A kettle with about 2½ gallons of boiling water scalds the two pails that are part of the milker, two lids, strainer and four milk pails—two of them the narrow-topped pails they use when stripping the cows, and two high pails they pour the milk into for carrying to the straining room and weighing.

"I think you will grant," said Mr. Markham, "that the milking machine actually helps us to keep up the quality of our milk. It also gives us a big net saving in time. We had a mighty good check on that these last few weeks when we have had a new milking machine out here on trial. We have run it right along with the two single units we always use. With the three machines, the herdsman has been milking 26 cows while the other man is milking 6 by hand out in another barn. Of course, that is too fast; it keeps him on the jump all the time. We would not have him take care of the three units right along. You see, we weigh all the milk from every cow, and I think it unwise to have him work at that speed. He does not have time to notice the condition of the udder, or any variation in the operation of the machine."

When that 1926 ordinance went into effect, Mr. Markham found that he would be in line for an extra 40c a hundred pounds for his milk if he would strain it in a separate room and cool it down to about 50° for delivery. He was already meeting all the other requirements for Grade A pasteurized milk. This Grade A milk satisfies the same requirements that some of the large eastern cities have set up, except that it is not bottled on the farm.

Effective Cooling Accomplished

Since Mr. Markham's herd was producing from 600 to 800 pounds of milk a day, that 40c was an item of considerable importance.

"Cooling was the next big job for us," went on Mr. Markham. "We tried at first to cool the milk with water, because our well water registers 51° and our automatic water system made it easy to get. But it took 12 pounds of water to cool one pound of milk and it wasn't so easy to get rid of. We

had water running off in streams. We drained it away from the barn with pipes, but even then it developed marshy spots and a stagnant pool.

"Then we tried an aerator cooler because it takes less water than a tank cooler, but the aerator gave us the extra job of keeping it sanitary. That work increased the cost of producing milk. During busy times, when every one is rushed with work, it was neglected, and that was unfortunate for the milk check. So I set out on a pilgrimage to study the methods of refrigeration other dairymen were finding profitable. I liked the positive control of mechanical refrigeration. So I came home and planned a tank cooler for myself."

The tank Mr. Markham built is big enough for eight 10-gallon cans of milk. The walls have 4 inches of cork insulation. Inside and outside they are made of shiplap. The whole tank is lined with galvanized iron. It has angle irons at the corners for reinforcement. The cover is just as well insulated and is so heavy that he has swung a counter weight at the end of a rope so he can lift the cover with a touch. A ½ h.p. motor on a regular commercial unit cools the tank. It is adequate for 10 or 12 cans of milk.

Myron Veek, the herdsman, keeps careful records of each cow's production.

The control on the refrigerating unit is set to keep the water at 46°. Mr. Markham does not run the cooler all of the time, but his schedule is so worked out that it provides perfect cooling for his needs.

Work Well Organized

When Mr. Veek goes out to the barn at 4:00 A.M., he turns the motor on. After he weighs each pail of milk, he strains it into a 10-gallon can. As soon as the first can is full, he takes it over to the cooling room, and stirs it thoroughly when he puts it in the tank. When he takes the second can over, he stirs them both, and repeats the stirring as he brings each can.

Then he goes in to breakfast, and when he has finished the milk is ready for delivery. It must reach the dealer early to go through the freshly sterilized vats and bottler before he uses them for his other grades. Mr. Veek leaves Rulondale about seven and is in town seven minutes later with the milk below 55°.

The night's milk had gone through the same process, only the motor had been left running for two or three hours until the milk was down to 46° or 48°. In the morning it is not over 52° when it is moved back from the coils to give the morning's milk the cooler place.

Cost of Outfit Low

"The whole outfit, tank and refrigerator, cost us just $500," said Mr. Markham. "We have been running it for two years now. The first year we ran it from a private plant, but now we have high line service. I was curious to know just what the operation cost is, so we put a meter on it last June. From the 26th of June to the 26th of October, I used just 277 kilowatt hours of electricity. That is about 69 kilowatt hours a month during the hottest part of the year. I use the tank in the winter, too,

Three good reasons why Mr. Markham is genuinely interested in pure milk.

with the refrigerator off, because the insulated tank keeps the milk from freezing.

"I have set up my costs like this:

Depreciation @ 10%.	**$50.00**
Interest @ 6%.....	**30.00**
Electricity	**24.00**
	$104.00

"The $2.00 a month for electricity is high, because we do not run the motor every month, but even at that the total cost is surprisingly low, you notice. I count my depreciation at $50 a year. No one knows yet whether that is conservative or not.

"This cost of about $100 a year brings us a premium of 40 cents a hundred pounds on from 20,000 to 25,000 pounds of milk a month, or from $80 to $100 a month in extra money. Of course, this premium above the regular local price for milk is not secured just because we cool the milk. But cooling is the neck of the bottle; without the cooling we would not get the premium."

"I am glad that we have been able to prove that modern methods will produce quality milk at a profit on the ordinary farm."

"I can't marry him, mother. He's an atheist and doesn't believe there's a hell."

"Marry him, dear, and between the both of us we'll convince him he's wrong."

Portable Outfit Devised for Precooling Fruits

A simple device which enables fruit growers and shippers to convert an ordinary refrigerator car into a "precooling plant" has been perfected by workers of the United States Department of Agriculture. The device weighs only 85 pounds complete and is easily carried from car to car. Its use allows the fruit to be loaded directly in the car from the packing house, thus saving the cost of extra handling incident to a trip to a precooling plant. This arrangement saves time and labor for the growers, and in addition it makes possible the cooling of fruit loaded at many small shipping points where no precooling plant is available.

The portable precooling device consists of a small electric motor and a high-speed blower. When two of these motor-driven blowers are put into operation in the bunkers of an iced and loaded car the natural circulation of air is reversed. The cold air is pulled up from the ice compartments at each end of the car and blown out over the top of the load, cooling the top layers much faster than they would be cooled with the natural circulation.

The new device has been used for precooling strawberries in North Carolina and Florida, and for peaches in Georgia. More recently it has been used with success in precooling citrus fruits in Florida. The portable feature is especially important.

Because of the simple construction of these units the cost of a complete outfit is less than $250. The cost of operation depends upon the cost of electrical current and the kind of fruit to be cooled, but trials made so far indicate that the total operating cost for precooling a car of strawberries should not exceed $5.

Assembling of these outfits has been started on a small scale by a commercial concern. However, the device is covered by a public-service patent, and any one who cares to may assemble his own unit.

Letting Motors Save Muscles *in Oregon*

Electric Tool Sharpener a Necessity on a Well-Managed Farm.
Mr. C. J. Hurd, Investigator Oregon C. R. E. A., sharpens the knives for the silage cutter at the Oregon Experiment Station.

IT is entirely in the hands of the feeder to make a 5 H.P. motor on a silo-filling job a success or failure, according to Mr. F. E. Price, Agricultural Engineer of the Oregon Committee on the Relation of Electricity to Agriculture.

Mr. Price in his old clothes was not only supervising the filling of the silos at the State Experiment Station, Corvallis, Oregon, but was doing the feeding himself, on the occasion of the writer's recent visit.

"You can see," said Mr. Price, "that we are successfully doing the job at the rate of 4 to 5 tons per hour with a 5 H. P. motor, while it has always been considered that a 7½ or 10 H. P. motor is necessary. However, the feeder can jam the works very easily by overfeeding.

"We are at present using a 13-inch cutter. The pulley on the cutter is 18 inches in diameter, and the speed of the blower is 500 R. P. M. It is important that the speed of blower be no higher than we are running for a 35-foot silo. Also, the knives should be changed each half day.

"A tool sharpener on a job of this kind is a necessity."

A test of power requirement with different speeds of the blower showed that increasing from 470 R.P.M. to 600 R.P.M. necessitated an increase of 1 H.P. in the motor.

A demand meter registering the average maximum demand for any 15-minute period showed that the maximum demand on the silo-filling job was 5 Kw.

Chopping Hay with 5 H.P. Motor

"We chopped 70 tons of hay and blew it into the hay mow last winter," continued Mr. Price. "with this same cutter, and could

not clog it with the hay. The 5 H.P. motor gave ample power to cut the hay at the rate of one to one and one-quarter tons per hour."

Hoisting Hay

We found a hay hoist of some kind run by electric power in nearly every barn at the station.

The friction hoist, developed by the Oregon Committee, replaces one man and team.

According to H. B. Howell, of Grants Pass, Oregon, it would save him $42 cash in the expense of hoisting 100 tons of hay into the loft each year, by eliminating the use of one man and team.

There is a good argument for the man who says he can't afford a hay-hoist for a few days' work. "This hoist," says Mr. Price, "will soon be on the market for $75 to $85." Forty-two dollars would pay a big interest on a hoist, also on a utility motor, which can be used for many other jobs during the year. At 3c per K.W.H. the power cost is 1 cent per ton of hay hoisted.

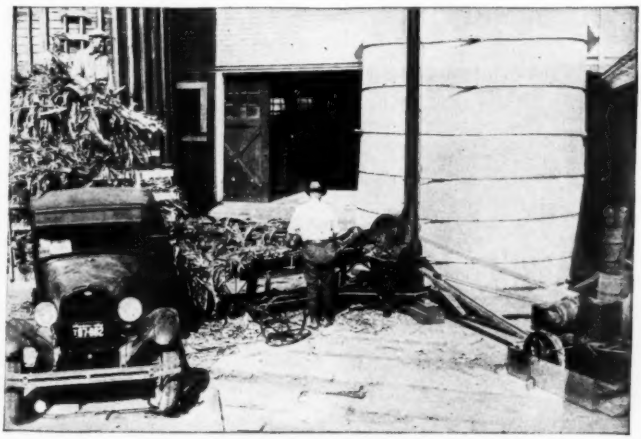
The friction hoist here referred to is simple in construction. It is so arranged that a man can drive a load of hay alongside of the barn, and by pulling a string start the motor, then by the manipulation of a rope and fork unload the hay alone without getting off the wagon.

A bulletin on hay hoists, just published by the Oregon Committee on the Relation of Electricity to Agriculture, fully describes it.

Grinding, Mixing and Elevating Feed

At the Experiment Station poultry plant a small hammer mill was grinding the feed. An 8-ingredient laying mash was thoroughly mixed with a small Ross vertical cone feed mixer, size 7 to 9 cubic feet, 250 to 300 lbs. capacity, operated by the same 3 H.P. electric motor that was used to operate the feed grinder and sacking elevator. The power required by the mixer was ½ H.P.

It took one man 1½ minutes to load one batch of 250 to 300 lbs. of the feed ingredients into the mixer; 3 to 4 minutes to mix it thoroughly; and 5 minutes to elevate and sack it. This small outfit is about the right size to keep one



Filling Silos With 5-H.P. Motor

Mr. F. E. Price feeding the silage cutter at the Oregon State College, Corvallis, Oregon.

man busy to the best advantage.

The power required to mix 2,900 lbs. of feed and grind 500 lbs. was only 3.4 Kw. Hrs.

It takes much less time to measure each food ingredient in container rather than to weigh it when making up a batch of feed for the mixer.

This small farm hammer mill, mixer and elevator can all be operated with a 3 or 5 H.P. farm utility motor.

"Clean Fires"

Electric Sterilizing Equipment Is Fast and Efficient

By R. R. PARKS

WITH the coming of chemical sterilization to replace steam in the dairy, many dairymen hesitate to continue investing in and operating a steam boiler. Some have grasped the idea that "Electric Fires Are Clean Fires" and that electric heat can be placed *in* the water rather than under *it*. The result is cooler wash rooms in the summer, cleaner wash rooms all the time, and heat at the turn of the switch. There are no daily chores connected with it.

A 3 Kilowatt Immersion Water Heater helps to speed up the washing in this dairy near Springfield, Missouri

But, How About the Cost?

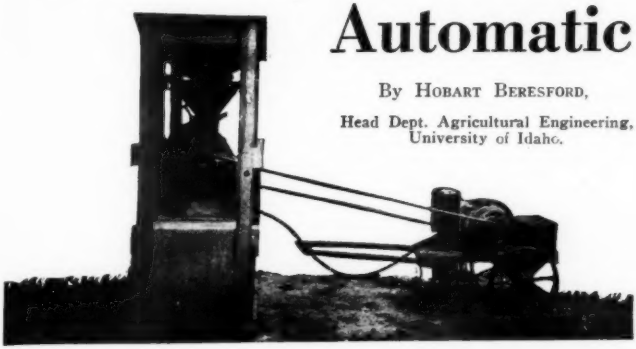
C. D. Heinlen near Mexico, Missouri, has been using a 3 kilowatt immersion heater in a "tailor made" tank 16 inches by 22 inches by 11 inches high for the past two years. Mr. Heinlen operates a 25 cow dairy and retails the milk in Mexico. The daily washing consists of a milking machine double unit, 7 cans and pails, and an average of 300 bottles. The electricity for heating the water has cost approximately 14 cents a day at the rate of 3 cents a kilowatt-hour. Mr. Heinlen discarded a kerosene stove for his electric heater. He says that the saving in time alone pays him for changing over. His wash room looks better and the daily "clean-up" is accomplished with more satisfaction than before.

Mr. French Changes Over

Francis French, near Springfield, Missouri, had the same problem as did Mr. Heinlen. He was using chemical sterilization; and, a kerosene stove with which to heat his wash water. When the idea of electric heat was suggested to him, Francis also invested in an immersion heater, and had the local tinner build him a large and "roomy" tank in which to install it. The "roomy" tank proved to be expensive as well as unnecessary so Francis started "trimming" to reduce the quantity of water to be heated each day. Accordingly, the tank was cut off to be 17 inches by 20 inches by 10 inches high. His cost then averaged 45 cents a day for electricity (at 3 cents a kilowatt-hour) for heating water to wash 4 single unit milkers, 8 ten-gallon cans, a milk cooler, and 320 bottles each day from the 50 cow dairy. Francis has been well satisfied with his heater because it is faster and more satisfactory in every way than his old method. The cost seems high, he admits, but he would rather "save" in another way.

Make Your Grinder Automatic

By HOBART BERESFORD,
Head Dept. Agricultural Engineering, University of Idaho.



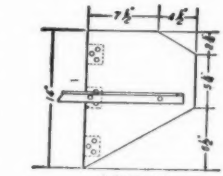
Automatic feed grinding demonstration operated by a portable electric motor.

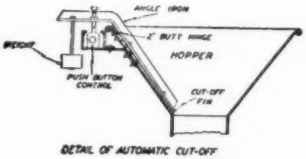
ONE of the attractive possibilities in the use of electric motor power for feed grinding on the farm is the automatic or remote control to which this source of energy is so admirably adapted. Automatic temperature controls are common in incubators, brooders, household water heaters, dairy sterilizers and refrigerators. Pressure and float operated switches control the domestic water systems and pumps, time switches and ordinary household alarm clocks operate the poultry house lights. Yet little has been done to encourage the automatic control of the farm feed grinding motor and equipment.

Automatic Shut-Off Developed

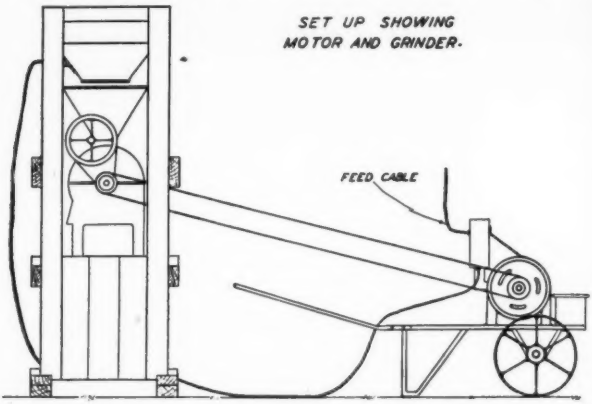
During the past year the Department of Agricultural Engineering of the University of Idaho developed an automatic shut off for the feed grinding equipment on the Caldwell Substation Farm. This device consists of a pressure fin hinged to form a sub-wall of the feed hopper on the small hammer mill. When the supply of unground grain in the hopper is exhausted the lack of grain pressure on this fin allows the weight on the end of the fin arm to push against the button of the remote control starter of the motor.

For operation the outfit is set up where a predetermined supply of grain can be fed into the hopper. The grinder must be equipped with a ground feed elevator, or mounted over a receiving bin that will take care of the ground feed. The grinders equipped with agitators in the feeder throat are best adapted to automatic control. After the outfit is once started and the feeding rate adjusted to the capacity



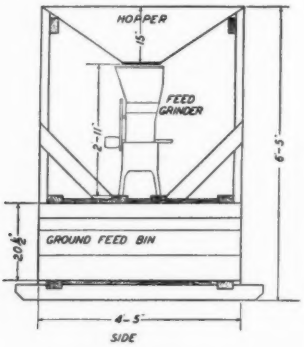


These sketches show details of construction of automatic cut-off



This diagram illustrates how the motor and grinder are placed and connected.

of the motor, further attention is unnecessary. The sketches show the details for construction of the control. The photograph is of a demonstration outfit prepared as a Fair exhibit for the Idaho Committee on the Relation of Electricity to Agriculture. The mill at the Caldwell Substation makes use of the blower elevator for the ground grain. When fine grinding is required a dust collector is also used in connection with the blower. For grinder speeds below 3000 r.p.m. and electric motors of less than 5 H. P. the hammer type mills should be used without the blower attachment.



Feed grinder is placed directly above ground feed bin, thus avoiding unnecessary handling.

Dairy Herd Improvement Is Reflected in Milk Pail

Wisconsin leads all other States in the number of dairy-herd-improvement associations. It has 154 out of a total of nearly 1,100 in all the States, according to reports compiled by the Bureau of Dairy Industry of the United States Department of Agriculture.

These associations give dairymen information as to the profitableness of their cows. On the basis of such information, association members have been weeding out the less desirable animals and retaining heifers from the more productive cows. The value of this practice is reflected in the steady increase in the average production of the cows under test in these associations. In 1920 the average production per cow in these herds was 247 pounds of butterfat. In 1924 this had increased to an average of 279 pounds. According to the bureau's records the production figures for the years from 1925 to 1928 were 284 pounds, 289 pounds, 293 pounds, and 295 pounds.

How to Grind a Drawshave

By L. M. ROEHL

GRINDING a drawshave is a job of only a few minutes if a motor-driven grinder is at hand for the work.

Drawshaves are made in two ways. One kind has the bevel on one side only, like a wood chisel, plane bit, or ensilage cutter blade and the other has the bevel on both sides. The following directions are for the kind that has the bevel on one side only.

The first thing to do is to see if there are nicks in the cutting edge. If so, place the tool flat on the tool rest with the cutting edge square against the grinder and by drawing the tool lightly across the face of the grinder the edge is ground back to the depth of the nicks. If, on examination of the edge, no nicks appear, this step is not necessary.

To cut well the bevel on the tool must be flat as shown at A in Fig. 1, or slightly hollow ground as shown at B. If the rounding in shape as shown at C it will not cut well even though the cutting edge is sharp. If the

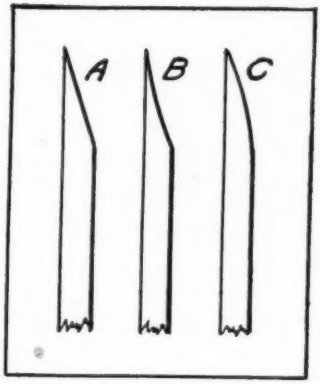


Fig. 1. Sketch showing right and wrong bevel on the drawshave.

Fig. 2. Grinding a drawshave on a motor driven grinder.

grinding is done on a large grindstone a bevel is made that is nearly flat. The concave or hollow ground shape is produced by using a small grinding wheel. A grinding wheel that is 6 inches in diameter will produce a desirable shape.

A good position for holding the tool is shown in Fig. 2. The tool is held firmly in both hands and while holding it lightly against the grinder it is gradually moved right and left. It is good practice to hold the tool on the grinder, note carefully the position of the tool, then look at the result to make sure that the position is right before continuing the work. Holding the tool on lightly and moving it across the grinder right and left prevents heating the tool and drawing the temper. The grinding is continued until the tool has been brought to an edge. The wire edge may be felt by drawing the flat side of the tool across the palm of the hand.

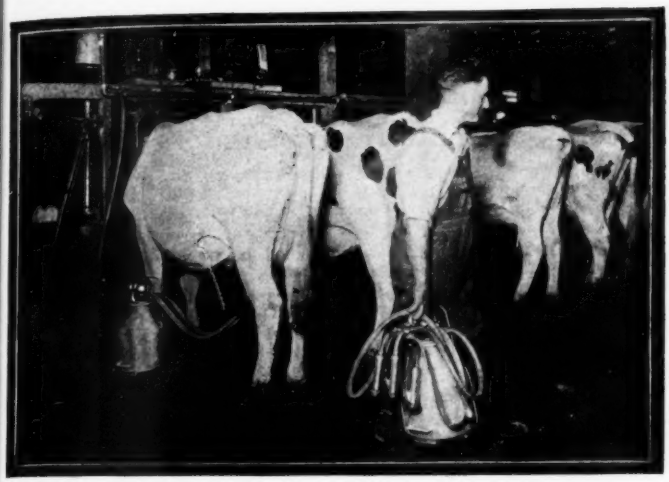
After the tool has been ground to an edge, it is honed. This may be done with a whetstone or an oil stone. A flat oil stone is the better tool for the honing. The stone is held flat on the flat side of the drawshave and drawn across it several times. It is then held as shown in Fig. 3 and another bevel made shorter than the grinding bevel. If the grinding has been done so as to turn the edge, a few strokes of the oil stone will remove the wire edge and bring the tool to a fine cutting condition.

Master Farmers Give Credit To Efficiency

That efficiency in production is fundamental in successful farming was demonstrated anew when the latest group of Master Farmers was chosen for Ohio. In announcing his selections, one of the judges made the statement that the winners' farms were especially efficient from the standpoint of equipment, which no doubt explained why they could average $7,000 a year income.

Every one of these master farmer homes has the benefit of electricity, with running water and modern bathrooms.

Fig. 3. Honing the drawshave.



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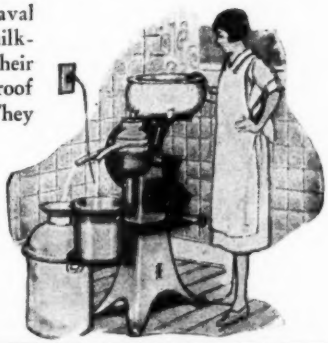

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Electrical Interruptions—

Their Effect on Eggs Hatched in Electric Incubators

By J. E. DOUGHERTY
Associate Professor of Poultry Husbandry, University of California

ACCURACY of regulation, automatic control, reduced fire hazard, are advantages which electricity has over other sources of heat and light on the poultry farm. It is quite probable, however, that many poultry keepers using electric energy for operating motors and lighting hen houses, have hesitated to use it to heat incubators and brooders because of the possible harm that current interruptions might do to eggs or chicks.

Young chicks must be immediately taken care of and kept comfortably warm in some other way if a serious interruption should occur to the electrical supply. The unhatched egg, however, is different. Embryologists know that embryonic growth begins when the egg is fertilized in the anterior portion of the oviduct and continues while the yolk is being enveloped in albumen, membranes and shell. It is only after being laid and cooled below 70 degrees F. that growth ceases and the embryo becomes dormant. It is not at all uncommon for a poultryman to forget to return the eggs to the incubator after cooling at night, fail to discover the mishap till next morning, and get a fine hatch. Other instances are reported of poor hatches that are blamed on power interruptions.

Experimental Work to Get Facts

To obtain some really definite information on the effects of current interruptions of varying duration occurring at different times during the incubation period, experimental work was begun by the writer at the branch of the Poultry Division of the University of California located at Davis, Calif. It is, we believe, the first piece of work of this nature ever undertaken. And as only one hatch has been made to date, the information contained in this paper represents

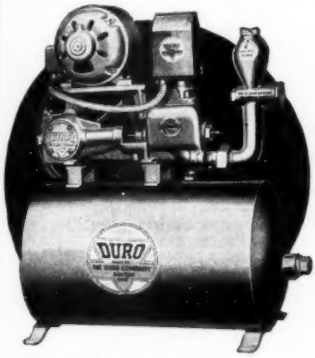
TABLE 1

Effects of Depriving Hen Eggs of Heat for Varying Periods of Time at Different Stages of Incubation

Lot No.	Days in Incubator Control	Deprived of heat hours	No. eggs set	Chicks hatched to fertile eggs, percent
1	.....	..	110	74.5%
		6 hours	30	76.0
		12	30	62.5
2	5 days	18	30	62.1
		24	30	82.8
		6	30	75.9
		12	30	68.0
3	10 days	18	30	65.2
		24	30	82.6
		6	30	71.4
		12	30	60.0
4	15 days	18	30	60.7
		24	30	64.3

The *easiest way* to have RUNNING WATER

You can start by having running water under pressure, at the turn of a faucet, in the kitchen. Later on when your water supply requirements increase and you want running water in the bathroom, laundry, on the grounds and in the barn, you can have it easily without buying a larger size pump.



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but a progress report of what is being done. The hatching trials are being continued and amplified, however, in co-operation with the California Committee on the Relation of Electricity to Agriculture and further reports will be made as the work proceeds.

Some Figures

In this first hatch were 3 lots of 120 eggs each and one lot of 110 eggs. They were set in a hot water heated Newtown Giant incubator equipped with automatic egg turners. Lot 1 contained 110 eggs and served as the control or check lot. This lot was not removed from the incubator until the hatch was completed except when taken out for testing at the end of the first week and again at the end of the second week of incubation. Lot 2 contained 4 groups of 30 eggs each. This lot was taken from the incubator on the fifth day of incubation and the 4 groups held at room temperature for 6, 12, 18 and 24 hours respectively before being returned to the incubator. Lot 3 was removed from the incubator on the 10th day and the 4 groups of 30 eggs each which it contained were also held at room temperature for 6, 12, 18 and 24 hours respectively before being put into the incubator again. The 4 groups of 30 eggs each in Lot 4 were given similar cooling on the 15th day of incubation. Thus in addition to being tested and otherwise receiving exactly the same kind of treatment during the incubation period as the control lot, the 4 groups contained in each of lots 2, 3 and 4 were deprived of heat above room temperature for 4 similar periods at 3 different stages of embryonic development.

Those groups in lots 2, 3 and 4 which were out of the incubator for 6 hours were taken out at 8 A.M. and put back 2 P.M. The groups that were out of the incubator for 12 hours were removed at 8 A.M. and returned at 8 P.M. The groups out for 18 hours were removed at 2 P.M. and replaced at 8 A.M. and the 3 groups that were cooled 24 hours were taken out at 8 A.M. and put back at 8 A.M. The room temperature ranged from 50 degrees F. at 4 A.M. to 75 degrees F. at 2 P.M.

These eggs were subjected to rather more severe cooling than they would be in commercial practice if the electricity should be cut off. When taken from the incubator, they were subjected to a sudden drop in temperature represented by the difference between the temperature of the incubator and that of the room. In practice the eggs would remain in the incubator where the temperature would fall more or less slowly to that of the room. Just what difference in effect, if any, the sudden reduction in temperature to which the experimental eggs were subjected as compared with the slower cooling most likely to occur in practice, would have on the developing embryos has yet to be determined.

What the Table Shows

Table 1 gives the hatching results with the different groups of eggs. These results are rather conflicting in the case of lots 2 and 3 since the group in each lot which was cooled longest hatched best whereas the groups receiving the intermediate amounts of cooling hatched more poorly than either the groups cooled least or those cooled most. This brief data, therefore, cannot be said to indicate any particularly harmful results from an interruption to the supply of electricity lasting as long as 24 hours to eggs that have been in the incubator either 5 or 10 days.

In the case of lot 4, however, which had been in the incubator for 15 days, the hatching results obtained from each group were consistently lower than with groups containing younger embryos or with the control lot. Here again the group cooled longest hatched better, for some reason, than the 2 intermediate groups. Yet the hatching results as a whole for lot 4 and the general trend of these results tend to show that electrical interruptions of more than a few hours duration become more and more detrimental as the hatching period advances and the embryos grow in size.

Are You Satisfied?

OF those farm homes now having electric service only about 5% have electrical refrigeration... 10% have ranges ...13% percolators... 42% vacuum cleaners ...mainly due to lack of suitable wiring—*convenient outlets.* The cost of wiring extensions is trivial once electric service has been installed.

Farming is a business requiring efficiency; it is a *problem of economics,* the same as any other. It is significant that *farm profit* is approximately in direct proportion with that farm's electrical equipment. As electricity has developed the steel, mining and textile industries, so is it developing the Farm. Electricity is the logical agency which not only lights the farm but pumps water—operates the workshop—milks—churns—grinds feed—saws wood—loads—sterilizes—shears—ventilates—refrigerates—sprays—*etc.* Electricity is not a lazy man's servant... It is the progressive farmer's ally!... *It insures profits.*

Look to Your Wiring

Call in your local *Contractor-Dealer.* Let him check over your wiring and make recommendations for profitable extensions. For the sake of *Economy—Safety—Permanence*—he will suggest KNOB & TUBE WIRING... using hard vitreous porcelain insulation. KNOB & TUBE WIRING minimizes *fire hazard*... offers *long life*... reduces *initial* cost... and insures *dependable service.* Your contractor is reliable... he knows how to install the KNOB & TUBE System

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Findlay, Ohio

Watts and Kilowatts

NOT long ago a gray-haired man said to me, "All my life I've been learning to talk. Late years it's been carburetors, spark plugs and speedometers, propellers, cockpit and biplane, and now since we've been getting electricity on our farm, it's volts and watts and kilowatts."

I had never thought of it in just that way before, but, of course, it is true. We are all of us learning to talk all our lives. New words are put into our mouths each year. We stumble over them a little at first, but we learn them in time and use them as readily as the old ones.

We grew up buying oil for our lamps by the gallon. We are perfectly familiar with that sort of standardization. But that was a new word, and a new unit for measuring one day. When the first milkman came around with a little tin measure and said,

"Madam, I'm going to sell milk by the quart now. How many will you have?"

Somebody answered, "Quart, quart, what do I know about quarts? Give me so much in this pitcher," pointing out the depth with her finger.

So the woman who is buying electric lamps and electric fans is sometimes confused at the thought of measuring the electricity it is going to take to light and heat them.

The salesman tells her the lamp will use 50 watts, the iron 600, perhaps.

"Watts! watts!" she cries. "What do I care about watts? I want to know what my bill is going to be."

But if she wants to figure her probable bill beforehand, or if she wants to check it up afterward, she can't escape getting acquainted with watts. They are a new unit of measurement she must reckon with. She is buying watts at work every time she turns a switch on a lamp or pushes in the plug of the vacuum cleaner.

The watt was arrived at by careful engineering study, so I suppose was the gallon and the yard. You can trace its history if you are interested. But just as we buy 10 gallons of gasoline without ever knowing who set up the gallon as a measure of capacity or how he arrived at exactly that amount instead of some other, some day we will come to accept watts as the way we measure electricity.

Each piece of electric equipment, and each lamp is built to use a certain number of watts, and when the switch is opened that lets the electricity flow to them, just that amount will be drawn from the wires.

We pay for watts by the hour. One watt used for one hour is the basis on which we buy our current. But watts are too small to be a practical commercial measure, so we get them by the thousands instead of one at a time. One thousand watts used for one hour make one 1,000-watt hour. Somewhere in its development the namers of things set the prefix kilo—meaning thousand—before watt instead of the number, and now we call the unit of electricity that we pay for a kilowatt hour.

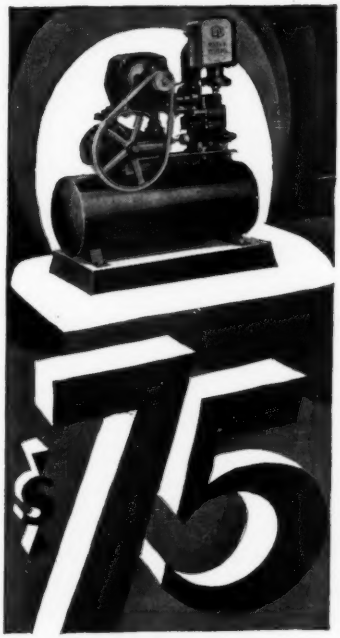
So if you have an electric heater that is marked 500 watts on the nameplate, you know that if you use it two hours, you will use 1,000 watt hours or one kilowatt hour. If your rate is 5c a kilowatt hour, you have bought just 5c worth of electricity to keep somebody comfortable on a chilly morning.

THE LAST EXCUSE FOR PUMPING WATER IS GONE!

◆

THIS FAMOUS AUTOMATIC DL WATERBOY ONLY

◆ ◆ ◆



THIS sturdy, quiet, DL Water System removes the last excuse for not having running water in your home. *For it costs only $75 f.o.b. Dayton!*

Here's $1000 worth of luxury for a few cents a month. It makes possible hot and cold running water in the kitchen. An inside toilet. A modern bathroom. It's just like having city water—*without a meter.* Because the DL Waterboy is fully automatic. It runs itself, oils itself, starts and stops itself. And it's built to last for years. One-third heavier construction—tested seven times for perfect operation—guaranteed by Delco-Light and backed by General Motors. And it's yours for a small down payment *and terms you make to suit yourself.*

New, illustrated book tells all about the famous DL Waterboy and other DL Water Systems for deep and shallow wells. The book is free. Mail coupon today for your copy.

DL ELECTRIC WATER SYSTEMS
Products of General Motors

Also Manufacturers of Delco-Light Electric Power and Light Plants and Delcogas for Household and Commercial Use

DELCO-LIGHT COMPANY,
Subsidiary of General Motors Corporation,
Dept. P-95 Dayton, Ohio.

Please send free book that tells all about the famous $75 DL Waterboy and other DL Water Systems.

Name.....

R. F. D......*Town*.....

9-75

County.....*State*.....

Is a Nine-Hour Day Leisure?

The Weekly Round

	Hours	Min.
Preparing meals	16	14
Clearing away meals	8	30
Food preservation		53
Other food work		14
Cleaning and straightening the house	8	15
General care, lights, fire, etc.	2	17
Laundering	5	21
Sewing	4	11
Mending	1	45
Other care of clothing		13
Care of children	2	26
Buying	1	47
Miscellaneous		53
	46	359
	52	59

WE are by nature a curious people and this is a particularly curious age. We are interested in everything, everywhere. One of the things it has occurred to us to be interested in o late is what the housewife is doing with her time. The reliable old tradition that "a woman's work is never done" is threatened by the growing idea in some sections that housekeeping is no longer a full-time job. Which is right?

That depends on who and where you are.

Two years ago the Bureau of Home Economics in the United States Department of Agriculture made a survey of more than 2,000 homes to get careful daily records of just how these home makers spend their time for the seven days of an ordinary week.

Cleaning and straightening the house takes eight hours and fifteen minutes a week.

Ironing time is cut down with an electric iron.

Seven hundred of them live on farms in the East, the West, and in the Mississippi Valley. These women were working just over nine hours a day, seven days a week—63 hours and 30 minutes. That looks like a full-time job, doesn't it? Fifty-two hours 17 minutes were spent in actual housekeeping; 11 hours 13 minutes in dairy, poultry, or garden work.

Almost half of that 52 hours of housekeeping was spent in feeding the family, in getting meals and washing up after them.

Mrs. Hildegarde Kneeland gives the division of these hours of labor for one group of women in the "Yearbook of Agriculture for 1928. She says:

"The figures of the New York home makers may be taken as characteristic of the average situation. Of the 52 hours and 59 minutes which they spent in home making, a total of 25 hours and 51

DAIRYMEN

Cool Your Milk with Kilowatts!

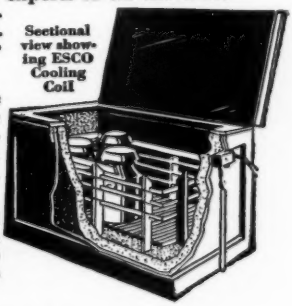
Keep your bacteria counts down . . . and secure the highest premiums on your milk by using an

Reg. U. S. Pat. Off.

ESCO

Electric Milk Cooling Cabinet

With electricity and the Esco, highest premiums are *easy*. Uniformly successful and universally acknowledged by dairy experts to be the most practical method ever invented for quickly cooling milk to below 50° and keeping it cold.



Sectional view showing ESCO Cooling Coil

No more bothersome ice to handle — no more troubles due to unsanitary, insufficient cooling. Automatic, efficient, economical.

Decide now to cool and store your milk this modern way—with ESCO and electricity. Ask for full details.

Ask your Power Company, Electric Refrigeration dealer, or write direct to us.

ESCO CABINET COMPANY

World's Largest Manufacturers of Milk Cooling Cabinets

WEST CHESTER, PA.

Four hours and eleven minutes go to sewing.

minutes was given to food—16 hours and 14 minutes to preparing meals, 8 hours and 30 minutes to clearing away meals, 53 minutes to food preservation, and 14 minutes to other food work.

"Cleaning and straightening the house was the next highest item, requiring 8 hours 15 minutes a week. The other items in the care of the house—the care of fires, lights, water supply, the repairing of furnishings, the care of house surroundings—added another 2 hours 17 minutes. Five hours 21 minutes went to laundering. Four hours 11 minutes to sewing. One hour 45 minutes to mending. Thirteen minutes to other care of clothing."

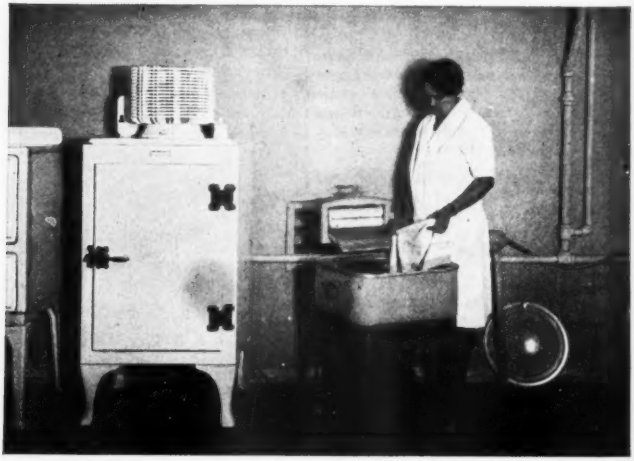
This left 5 hours and 6 minutes to be divided up into 2 hours 26 minutes for the care of children and other members of the family, 1 hour 47 minutes for buying food and household necessities, planning and other management, and 53 minutes for miscellaneous items. I suppose each housewife contributes a different job to this miscellany.

Fifty-two hours and 59 minutes to the dot.

After reading this report I could just see a thousand housewives tossing their heads at the Jeremiahs who are lamenting the dangers of leisure, and crying aloud:

"If this be leisure, make the most of it!"

The Bureau of Home Economics with characteristic versatility and thoroughness accompany these re-



Five hours and twenty-one minutes went to laundering.

For fatter hogs and for more milk

Just turn a faucet!

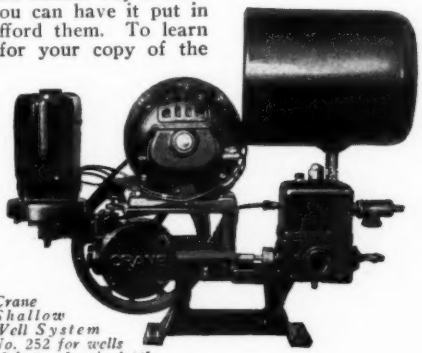
Crane Deep Well System No. 850 for wells from 22 feet to **250** *feet in depth.*

Consider what running water will do for a farm: Cows yield 5 to 8 per cent more milk. There is a corresponding weight gain in hogs; chickens give more produce; barns are really cleaned in a fraction of the time. The hours previously spent in chores are saved for profitable work in the field.

In the house: work of cooking and washing is done more quickly; sanitation is increased a thousandfold; and comfort becomes an actuality, not a dream.

The price of running water is not prohibitive. Crane Co. has brought the cost of its deep and shallow well systems to the lowest point commensurate with their sterling quality.

Even if you feel that you cannot buy a complete system at once, you can have it put in by units, as you can afford them. To learn what this plan is ask for your copy of the booklet, *Bringing Health, Comfort, and Larger Profits to the Farm*, or talk to a reliable plumbing contractor. To learn more about the materials themselves, visit the nearest Crane Branch and write for *Crane Automatic Water Systems Booklet.*



Crane Shallow Well System No. 252 for wells 22 feet or less in depth.

CRANE

GENERAL OFFICES: CRANE BUILDING, 836 S. MICHIGAN AVENUE, CHICAGO
NEW YORK OFFICE: 23 W. 44TH STREET
Branches and Sales Offices in One Hundred and Eighty Cities

With General Electric Motor

Your Washing Done

For the price of two 2-cent stamps

THIS is a message to every farm woman who is making the great sacrifice of health for the sake of a few cents a day.

It isn't worth the price! The day of back-breaking drudgery on the farm has passed.

The originator of the electric washing machine offers you the fastest, most modern washing machine on the market. It does *all* the work. It washes a tub-ful of clothes sparkling clean in 5 minutes. It has fewer moving parts than any washing machine on the market. No belts to slip and break—nothing to get out of order.

And this is the lowest priced quality washing machine on the market. We will gladly mail you fully illustrated booklets on all Thor products. Write to

THE HURLEY MACHINE CO.
22nd Street and 54th Avenue

Dept. 3-2 **Chicago, Illinois**

ports with suggestions for getting this leisure they did not find in the weekly schedules of these women. Mrs. Kneeland has an excellent discussion of ways and means in the June survey for last year. There are three things we may do with the jobs in our schedules, she points out: have them done outside the home, have them done by some one else or eliminate them entirely. There are not yet agencies for doing all of the jobs we might like to rid ourselves of; nor does the family income always permit our gaining leisure in this way. Money, as well as the difficulty of getting help, stands in the way of having the job done by some one else, and as for the last, most of us women "done broke our 'liminators" for household jobs.

You remember, of course, the man on the diner who changed his mind about his order and asked the waiter to "eliminate the eggs." After returning twice and asking respectfully for a repetition of the directions, the puzzled darkey came and said:

"Sorry, Captain, would you take 'em fried? We done broke our 'liminator."

Failing these, Mrs. Kneeland points out, our only alternative is increased efficiency on our own

We spend a lot of time getting meals.

part. We can effect some general sort of standardization of various jobs to banish the most glaring wastes of time and effort if we study our ways of doing them. We can also make use of more labor-saving machinery to cut down our working days. Mechanical power, Mrs. Kneeland believes, is the most promising supplement to our own back and arms we are apt to find. Machines are the creators of leasure for today's housewife.

But Mrs. Kneeland, who is evidently a woman with an eye to the future, prophesies that the commercial laundry, commercial housecleaning service, even the commercial meal provider will probably win our grand-daughters as customers, just as the clothing manufacturer, the canner and the baker have won us.

All-Night Lights in the Brooder House

By J. C. SCOTT

AFTER using a 50-watt light over each brooder hover, leaving it lighted through the entire night, Mr. F. L. Lyon, Route 1, Everett, Washington, one of the big poultrymen of Snohomish County, says:

"I think my chicks are doing better than ever before. So far this season I have lost only 75 chicks out of 4,000. This is a big improvement over last year. You can go out in the brooder house any time of night and see the chicks working and running in and out of the brooders."

Mr. Lyon is operating eight 1,000-chick electric brooders—seven Darling Brooders, manufactured in Everett, and one electric Underheat Brooder.

All brooders are of the flat-box type, and Mr. Lyon takes advantage of this by building the roosts on top of the brooders, which he claims teaches the chicks to roost within a few days with very little trouble.

The entire floor of the brooder room is covered with O. K. peat litter, and presents a very clean and neat appearance.

Now Equipped with gas engine for homes without electricity

a Washing and Ironing Machine Combined

At a price formerly asked for a washing machine alone

WOMEN on the farms—you can now be rid of the drudgery of both washing and ironing, and pay no more than you have been asked for a good washing machine.

The Hurley Machine Company has just perfected this complete laundry unit—the first and only machine of its kind. It combines the Thor Agitator—world's most thorough and efficient speed-type washer—with the New Thor Rotary Iron, that does your ironing in one-fifth the time required by hand.

The Thor name on this new laundry unit is your assurance of lasting satisfaction. Write us for illustrated booklets describing this and other Thor home laundry equipment.

THE HURLEY MACHINE CO.
22nd Street and 54th Avenue
Dept. 3-2 Chicago, Illinois

Questions and Answers

Conducted by H. J. GALLAGHER

Note—Readers are invited to send in questions which will be answered in the order received. Names are omitted from questions unless otherwise specified.

Question: *For the past two years I have been using my tractor on the ensilage cutter and planned this year to buy a feed mill that I could run with the tractor. I expect to have electricity in February and have been advised to buy a five-horsepower motor for feed grinding and silo filling. I would like your advice on the matter. It seems foolish to buy a five-horsepower motor when I already have a tractor that could do both jobs.—W. E. C., Nebraska.*

Answer: A tractor costs from four to eight times as much as a five-horsepower motor. Every working hour shortens the life of equipment, and where cheaper power (equipment) can be used to save all the working hours of a tractor for field operation, I believe the practice is economically sound. To purchase a small feed mill for tractor operation would mean running your tractor at less than full load, an expensive operation. A feed mill that would be a full load for your tractor would cost nearly as much as both a small mill and a five-horsepower motor. Tractor operation during cold weather is very annoying when you consider hard starting, filling and draining the radiator and the possibility of scoring the cylinder walls before it is "warmed up." More time and labor is required when grinding by tractor than by electricity.

The small electrically operated mill can be installed so that no handling of the grain is necessary while grinding. It takes from 10 to 30 K.W. hours of electricity per ton of grain with a five-horsepower hammer mill. The kind of grain and fineness of grinding largely determine the energy consumption.

The five-horsepower motor gives very satisfactory operation in silo filling when the speed of the cutter is about 450 R.P.M. and the knives sharp. A smaller crew can do the job and the energy cost is about ¾ of a K.W.H. per ton of ensilage.

Capitalize on your electric service by reducing your operating costs. This is one way of doing it.

Question: *What is the right speed to operate a 22-inch buzz saw with a 5 H.P. motor?—L. M. R., Mich.*

Answer: The peripheral speed of a circular saw should be between 9,000 and 9,500 feet per minute. Peripheral speed is the distance the saw would travel in one minute if rolled along like a hoop. The R.P.M., revolution per minute, of a small circular saw would have to be greater than the large saw to cover the same distance in the same time, the smaller the saw the greater the R.P.M. to maintain the proper peripheral speed.

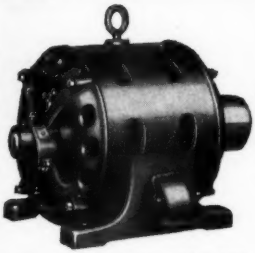
The peripheral speed divided by the circumference of the saw, in feet, gives the R.P.M.

$$\frac{3.1416 \times 22''}{12''} = 5.76 \text{ feet circumference of } 22'' \text{ saw.}$$

$$\frac{9{,}000}{5.76} = 1{,}562 \text{ R.P.M.}$$

A six-inch pulley on a 1,725 R.P.M. motor and a seven-inch pulley on the buzz saw would give the correct speed.

The method of determining the proper size of pulley is explained under "Questions and Answers" in the January issue of this magazine.



5 Horse Power Century Type RS Repulsion Start Induction Single Phase Motor

Century

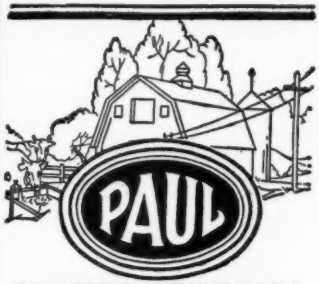
Century Motors Keep a-Running

Many thousands of farm installations have proven the ability of Century Motors to "Keep a-Running" and give years of continuous, trouble-free service. This is only one of many important reasons why you should choose them wherever electric motors will save time, money and hard work—frequently automatically.

CENTURY ELECTRIC CO.
1806 Pine St. St. Louis, Mo.

40 U.S. and Canadian Stock Points and more than 75 Outside Thereof

Century MOTORS



WATER SYSTEMS
Increase Farm Profits!

A LITTLE Paul electric pump will deliver *more water for a cent than a man can pump and carry in an hour.* Plenty of fresh, clean, cool water for kitchen, dairy and barn! *What a relief from back-breaking labor!* Facts prove, too, that ample water supply greatly increases profits from live stock, dairy and poultry.

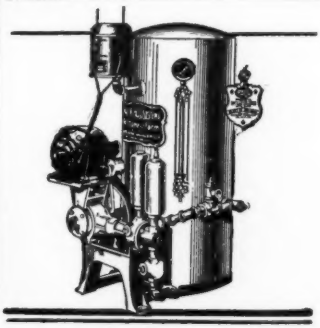
If you do not have an efficient water system, you are not getting the most from farm electricity. Write us today!

FORT WAYNE ENGINEERING & MFG. COMPANY
FORT WAYNE INDIANA
Pumps & Water Systems, Softeners, Heaters

Fort Wayne Engineering & Mfg. Co.,
1722 N. Harrison St. Fort Wayne, Ind.
Send complete information and prices on Paul Water Systems.

*Name*_____

*Address*_____



The PRATER MILL
(HAMMER TYPE)

5 H.P. $75

Save Money~ Grind Feed at Home!

Guaranteed
1. To be entirely satisfactory.
2. To use a minimum amount of current or power.
3. To give a high quality of grinding year after year.

HERE is the farm hammer mill that has won the recommendation of thousands of farmers, experiment stations and power companies. A practical farm feed grinder so sturdily built that it gives years of highly satisfactory service. No complex gears or plates to break. Ready at all times for efficient operation when you want it right on your own farm.

You will marvel at the tremendous saving and high quality fresh feed it makes possible year after year. Here it is ready to come to your farm as the most efficient hired man you ever had. Priced as follows:

2 Horsepower size.....$48.75 **3 Horsepower size.....$54.25**
5 Horse Power size.....$75.00
The power sizes are very conservatively stated.

Ask your power company for a demonstration.
Send to us for a new catalog.

PRATER PULVERIZER CO.
Dept. K, 817 West Washington Boulevard, Chicago

NOW! CHICK RAISING
IS SAFER · EASIER · MORE PROFITABLE

OAKES QUALITY POULTRY SUPPLIES

ELECTRIC BROODER

Oakes new 1930 Model automatic brooder raises healthier chicks, saves labor and minimizes losses. The new ventilating shaft is one of the most important improvements in brooder construction since electric brooders were first introduced. Oakes Electric Brooders are low priced and economically operated. Be sure to see them.

Also, see Oakes Electric Hen, the efficient, economical incubator, made in 60 to 165 egg capacities.

You can get Oakes Electric Supplies from your Public Utility Company, Electric Appliance or Poultry Supply Dealer. Write direct for Big Free Catalog.

OAKES ELECTRIC BROODER
4 SIZES, 100 TO 650 CHICK CAPACITY
Priced from $10.50 *to* $24

Valve - Float Fount. With Electric Heater Pan type electric heater 3-way switch, efficient, economical.

OAKES MFG. CO.
77 Dearborn St., Tipton, Ind.

Title Contest

For the best title to the front cover illustration, a cash prize of $25.00 will be awarded.

In addition we will pay $5.00 for each of five titles given honorable mention.

In case of a tie, each winning contestant will receive the full cash prize to which he or she is entitled.

The winners will be announced in the April issue.

Only the farmers or members of the farm family, to whom this magazine was sent, are eligible.

Only one title may be submitted.

Use the form below or write your answers on a plain sheet of paper in similar form.

Be sure to answer question (a).

Write plainly and send your suggestion to the Title Editor, ELECTRICITY ON THE FARM, 225 West 34th St., New York, before March 1.

First Prize—December Cover
"Enlightening Santa on His Current Problems"
Mrs. David F. Mohror, R 2, Peterson, Iowa

The following titles have been selected as the winners of the $5 cash prizes:

"A hot tip to the Frigid Zone," Mrs. P. J. Christiansen, Bennington, Nebr.

"A wise child maketh a glad father," (Prov.) Mrs. J. B. Clark, Centerville, Penna.

"Youthful advice for a modern device," Earl Merryfield, Appleton City, Mo.

"If Santa grants this current request, Mother and Dad will be well blest," Miss Mamie Warren DeRuyter, N. Y.

"Even from the pens of babes—Electrical suggestions," Myra L. Barnhart, R. 2, Menomonie, Wisc.

My Title for February Front Cover picture is.....

.....

.....

.....

(a) Fill in the brand name for each article you now have or plan to buy.

Product	Make We Now Have	Make We Plan to Buy
Range	.....	.....
Water System....	.....	.....
Milk Cooler.....	.....	.....
Incubator	.....	.....
Paint Sprayer....	.....	.....

Name..... R. F. D.....

Post Office..... State .....

Hot Beds Without Manure

By R. R. PARKS

IN the spring of 1929, the Missouri Agricultural Experiment Station cooperated with three farmers in St. Louis County in installing immersion electric heaters under frames which formerly were operated with manure as a source of heat. The experimental immersion heater units were made of ¾-inch galvanized water pipe in which was strung resistance wire insulated from the pipe by porcelain wiring tubes. The ends of the units were wrapped with splicing compound and friction tape to keep out moisture. The units for each bed were spaced approximately two feet apart. The heat for each bed was controlled by a switch in a nearby building.

The first set of heaters was installed in a 6 x 12 frame under 4 inches of soil. The upper 8 inches of frame was left exposed as was the manured beds. The total connected load of the units was approximately 500 watts. The bed was planted to peppers on March 7. During the following 11 days, 47 kwh. of electric current were used. During that time the outside temperatures fluctuated from 24 to 60 degrees as shown in Fig. 1, while the inside temperature fluctuated from 50 to 70 degrees for the same period. No insulation was used on these beds except the board covers which were placed over the sashes at night. The heavy black lines at the top of Fig. 1 represent the time electric heat was delivered to the beds. Notice that it was used only at night. After the peppers were up and ready to be "hardened off" the units were removed and placed in a bed for cabbage plants.

What the Test Showed

The second set of heaters was installed in a 6 x 16 bed. The total connected load was calculated at 550 watts. In this case the heat was left on continuously from March 12 to March 22, 10 days, and used 125 kwh. of energy. The day temperatures in this bed reached peaks of 100 degrees and better with outside temperatures of 60 to 70 degrees. Lettuce, cabbage, peppers, and egg plant were planted in this bed. Four days after planting, the lettuce and cabbage were up. Ten days after planting the peppers and egg plant were up 2 inches and were transplanted. At that time the same variety of egg plants and peppers were 2 inches high in manured beds which had been planted 7 days before the electric bed was started. It was interesting to note that the longer time of growth in the manured beds had allowed a heavy

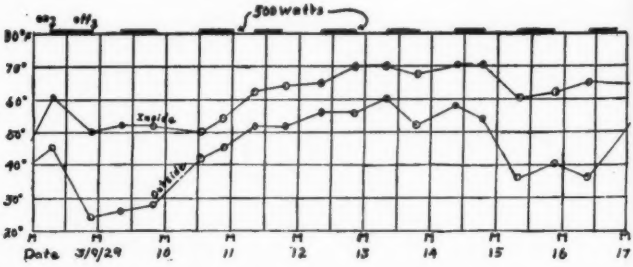


Fig. 1. Graph showing typical temperature readings from inside and outside an electric hotbed used in St. Louis county, Missouri.

Just Push a Button in Your Kitchen and

The LAUSON Electric Jack will make your old pump hump

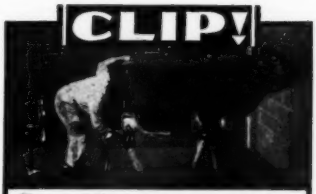
Deep or Shallow well, it works unfailingly — any weather.

Built Like a High Grade Auto Transmission

Fully enclosed running in oil. No chains or sprockets.

Also Complete Water Systems. Write for Literature.

The John Lauson Mfg. Co.
700 Michigan St., New Holstein, Wis.



by electricity

with the new Stewart Stockman Priced at ½ Previous Electric Models

It's a powerful, smooth-running, quiet one-man machine. Will give years of low-cost service. Supplied for any specified current from socket or lighting plant. Heavy duty motor can be belted to separator, churn, grindstone, pump, washing machine or other appliances.

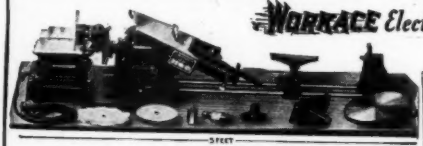
More Profit from Your Cows

Clipped cows give more milk, richer in butter fat. Clipped cows are easiest to clean—their milk is cleaner and stays sweet longer. Tests show increased profit as high as $1.40 per month per cow. Same machine clips cows, horses and mules.

Stewart Clipping Machines are priced as low as $14 for hand models; $45 for electrics, f.o.b. Chicago. At your dealer's or sent direct. $2 down, balance on delivery. Satisfaction guaranteed.

Chicago Flexible Shaft Company
5524 Roosevelt Road Chicago
40 Years Making Quality Products

WORKACE Electric WOODWORKER



Complete Electric Workshop for the Farm

Workace does hundreds of jobs. Pays for itself quickly in making hen coops, hot houses, repairs on implements and buildings. Fast, accurate and easy to operate from electric light socket. $9.00 down brings you Workace. Complete price $89.00. Send for details now. The boys will enjoy Workace.

Five Foot Workshop Includes:

4" Planer, 8" Circular Saw, 6" x 36" Lathe, 9" Disc Sander, 6" Buffer, 5" Grinder, ¼" Drill Chuck. ¼ H.P. G. E. Motor, 110 V., A.C., 60 Cycle. Endless V Belt. Two V-Stepped Pulleys. Cast Iron Sub Base. 10 Ft. Cable with separable Plug.

J. D. WALLACE & COMPANY
2848 West Adams Street, Chicago
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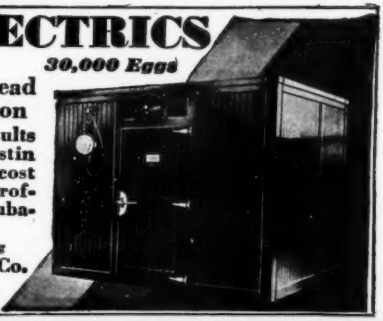
SMITH ELECTRICS

52,000 Eggs *30,000 Eggs*

The Farthest Step Ahead in Electrical Incubation



FIRST in performance, results and quality chicks. Lowest in current consumption and cost of operation—highest in profits. The outstanding incubator of today.

Write for new Electric Catalog

The Smith Incubator Co.
3192 W. 121st St.
Cleveland, Ohio

growth of weeds to start while there were scarcely any in the warmer electric bed.

The third set of heaters was installed under a 6 x 6 frame where sweet potato plants were to be started. This bed was made on April 6 and the current turned on, a load of 250 watts. During the following 13 days, 52 kwh. of electricity was used. The morning outside temperatures ranged from 32 to 70 degrees with the inside temperatures ranging from 55 to 76 degrees. A manured bed of "sweets" was planted at the same time as was the electric bed. At the end of 13 days the plants in the manured bed were irregular, some had not sprouted. The plants in the electric bed were the same height as in the manured bed, but were regular throughout the bed.

These first season results are "pioneers" in another field. Since knowing what to expect and having faith in the application, new experiments will give more figures on which to judge the costs and possibilities of electricity for hotbed heating. The advantages which first come to mind are:

1. Electricity can be obtained in quantities which are in proportion to the temperature of the weather.
2. Electricity requires no seasonal hauling or manual labor in preparation for the beds.
3. Electric heat can be placed directly in the soil around the seeds and plant roots.
4. Electricity has no poisons for plant life and no disagreeable odors.

Fully Acounted For

District Visitor: "To what do you attribute your great age?"

Oldest Inhabitant: "Well, for the first 70 years of my life there wasn't no motor cars, an' for the last 30 I've been confined to the house."—Montreal Gazette.

Small Boy: "What is college-bred, pop?"

Pop (with son in college): "They make college bred, my boy, from the flour of youth and the dough of old age."

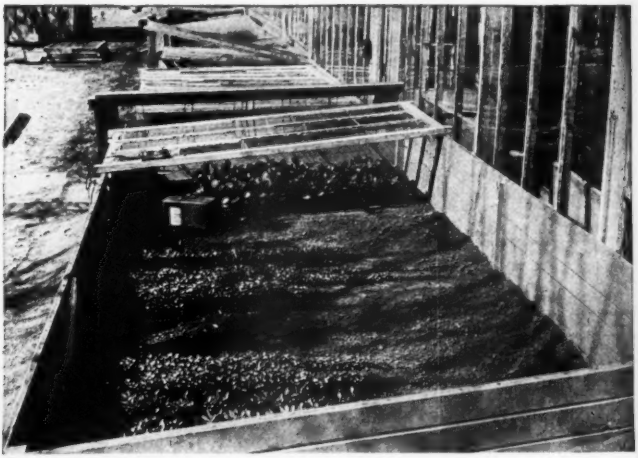


Fig. 2. The first electric hotbed used at the Agricultural Experiment Station, Columbia, Missouri.

The soil in this bed rests on a metal deck. The open heating elements are strung on porcelain insulators under this deck. Note the thermostat fastened to the end sash. This thermostat kept the electric heat turned off while the bed air temperature remained above 60 degrees Fahrenheit.

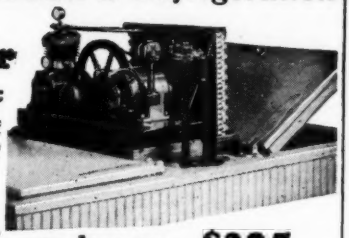
DOUBLE CAPACITY *Refrigeration*

at half the price

Glenn Dairy Icer

"A machine that will do the work . . . at a price you can afford to pay."

Cools 30 cans of milk, . . . Costs only 3c an hour to operate. Built for heavy duty by engineers who know dairy needs. Write for free, working plans on dry box or concrete tank construction.



Dealers: Write for Open Territory

Dairy Refrigeration Co., Inc.

Dept. G,—311-64th Ave., Milwaukee, Wis.

as low as **$325**

The Petersime "Challenger"

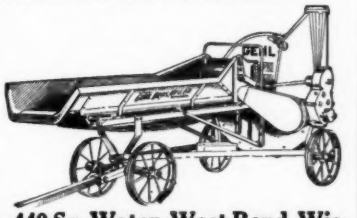
Results of the New Electric "Challenger" Incubator challenge all records of high percentage hatches, high-quality chicks, low operating costs and unusual profits. Write for the new "Challenger" Catalog today.

Ira M. Petersime & Son

EF-2 Gettysburg, Ohio

GEHL FILLS SILOS WITH A 5 H.P. MOTOR

A Combination that has surprised many by its economy and practical features. Fill your own silo when your corn is ready with the help you have on your farm and get the silo full. Power charge amounts to only from $3.00 to $5.00 per silo and a motor requires no attendant, saves one man's time. The Gehl Cutter requires less power because of its low speed, is absolutely self-feeding, has auto type gear shift, all gears in oil, boiler plate flywheel, ball bearings. Can be had self-contained, motor mounted right on cutter. Write for full information about cutter and running wih 5H.P. Motor.



GEHL BROS. MFG. CO., 449 So. Water, West Bend, Wis.

Clipping and Grooming Machines

with direct-connected motor

The Gillette Portable Electric Clipping and Grooming Machines appeals to every progressive farmer, because of its reliability. Attached to ordinary lamp socket either 32 or 110 V., it is instantly ready for work. Hanging or Pedestal types.

DEALERS—Send for attractive price list.

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45 Years Making Dependable Clipping and Grooming Machines

Send for FREE Book

NEW WAY TO MILK COWS

The Surge Milker

Free Demonstration

Ask for free demonstration of this wonderful new milking machine. The Surge milks cows like no other machine ever milked cows before—milks them faster, cleaner and better! Has NO long Tubes—NO Claws. Overcomes bacteria troubles. Milk travels only 4 inches from teat to to pail. Write at once for free catalog and details of our Free Demonstration Offer, Easy Terms and rock bottom prices.

BABSON MFG. CORPORATION

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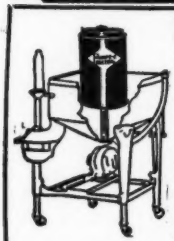
LYON
Electric Brooders
THE NEAREST TO NATURE'S WAY
The unusual construction of these complete brooders secures the finest results and decided savings in time and operating costs. Thousands used under all climatic conditions. Built for a lifetime of service. Send for authentic data on brooder operation and costs.
Also manufacture Power-off, burglar, and temperature Alarms, Water heaters, Time switches, Heating and thermostatic supplies for incubators, Battery brooders, etc.
Send for free interesting catalogue.
LYON ELECTRIC CO.
Dept. EF 2075 MOORE ST.
SAN DIEGO, CALIF.
(Specialist on electric heating for the poultryman.)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Pure, rich ice cream at home with a DIXIE FREEZER when you want it. It is easily clamped onto the dash post of any modern washing machine.
If your washing machine dealer can't supply you, write us, giving name of your washing machine.
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SAFEGUARD
Electric Four Purpose Alarm
warns you in case of burglary, fire, failure of highline current or change in brooder temperature. Protects one or all buildings.
Cannot be beaten in any known way; simple to install and economical to operate. Sold under money back guarantee. If your dealer can't supply you, write
SAFEGUARD ALARM CO. Inc.
Council Bluffs, Iowa

Hatching by Wire

(*Continued from page* 14)

playing day old chicks for sale. Brooders of this type are being used for raising broilers indoors usually in a pre-heated room. The chickens are kept on a floor of hardware cloth with a tight shelf underneath which can be readily removed for cleaning. Feed troughs and drinking vessels are attached, usually to the outside edges of the brooder. At the present time, the use of this type of brooder is rather limited being used by hatcheries for display and for broiler production where space is at a premium.

The extensive use of electric brooders and incubators, particularly on farms, has not been possible until recently because of the fact that there was a very small percentage of farms with electric service available except on the Pacific Coast. The rapid increase during the last five years of the number of farms served by rural electric lines indicates that in the next ten years many more farms will be added to such lines. Estimates place the number of electrified farms in 1938 at one-half the total number in the United States. Long before that time brooding or hatching "by wire" should be the accepted practice on a large percentage of farms.

Something Wrong

STRAYED: Cow, Holstein, fresh with calf three years old with horns. Please notify Joe O'Halloran, Pleasant Valley Road.
—*N. Y. paper.*

Sharpen Axes Quicker

LUTHER Power Grinder
Axe grinding is easy with a Luther grinder. Will not burn or draw temper. No. 306 and No. 307 grinders with ¼-H.P. motor makes handy farm grinder for all work. Takes about nine minutes for sharpening dull, nicked axe and current cost 6/10 of a cent; motor does the work. Literature and prices at your dealer or from us.
LUTHER, INCORPORATED
280 South Water St. Milwaukee, Wis.

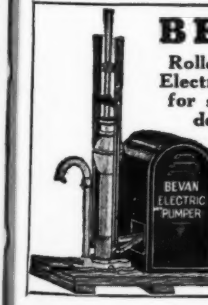
A Simple Field Test for Phosphorus in Soils

In an effort to eliminate some of the guesswork in applying phosphate fertilizers, workers at the Illinois experiment station have developed a simple method of determining the approximate amount of available prosphorus in the soil. The test can be conducted in the field and requires only a few minutes.

Materials necessary for the test are a representative sample of soil, a small tin rod for stirring, a test tube or vial, a color chart and a specially prepared acid solution to mix with the soil sample. The test is made by shaking one part of soil with about three parts of the solution in the test tube. After the soil has settled out, the clear solution on top is stirred with the tin rod (the rod must be tin to bring about the necessary chemical reaction). If the solution remains colorless, the soil is low in available phosphorus. If it turns light green, the phosphorus content of the soil is "doubtful"; if it changes to a greenish blue, it is "medium" and if it turns to a medium blue color, the soil is high in phosphorus. The color fades upon standing, but can be revived afterward within certain limits by restirring with the tin rod.

Barnum Never Had One

FOR SALE: One registered Jersey cow with bull calf giving four gallons of milk.
—*Neosho (Mo.) Democrat.*



BEVAN

Roller Bearing Electric Pumpers for shallow and deep wells

Literature on request

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***High-Pressure* WATER**

200 to 10,000 gallons of fresh, clear water per hour — at the turn of the faucet, just where and when you want it—under **enough pressure to give complete fire protection.**

Among our 200 sizes and models there is one just right for your work—models as low as $103.

They start themselves, they stop themselves. Install one and forget it. You'll always have plenty of fresh water at every tap and faucet.—Write.

KEWANEE
HIGH PRESSURE WATER SYSTEMS
KEWANEE PRIVATE UTILITIES CO.
464 Franklin St., Kewanee, Ills.

Ask Your Power Co.

About the now famous Smith Brothers Electric Brooder, which can be ordered direct from this list:

18 in.	75 chick size,	$9.50
24 in	100 chick size,	10.75
32 in.	200 chick size,	16.00
42 in.	350 chick size,	20.00
56 in.	600 chick size,	24.00
72 in.	1000 chick size,	36.00

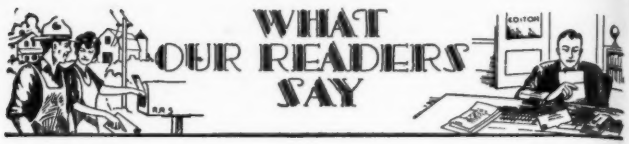
WELLINGTON J. SMITH CO.
850 Davis-Farley Bldg., Cleveland, Ohio

Electrical Heating Units

for all purposes in poultry raising and around the farm.

Write for descriptive Bulletins

RUSSELL ELECTRIC CO.
340 West Huron St. Chicago, Ill.



Does the Housework

Electricity is doing all our cooking — stove, grills, waffle irons, percolator, sweeping and ironing and contemplate putting in electric churn and electric refrigerator. In fact, have already made decision to put in electric refrigerator.

Fred. Massengill,
Terrell, Texas.

Electric Range Does the Cooking

Living on a ranch where human help is impossible to keep, we installed electricity to work for us. We invested in a range which I consider my most valued electric appliance. Since installation I have enjoyed vacations each summer which seemed impossible before. Husband does not mind cooking when all he has to do is turn a switch and heat is there. Danger of fire is eliminated when children cook. In summer it keeps my house cool when I cook for hay, harvest and silo men and when I can my hundreds of quarts of fruit, jellies and vegetables. In winter, too, it helps us all by cooking soups and stews galore.

Mrs. Adolph Bahler,
R. F. D. 5, Boise, Idaho.

Radio and Washer Help

I find education and pleasure in my electric radio and the electric washer helps me to get the family wash out early Monday mornings, but the biggest thrill a woman can get is to be complimented on her cooking. This I have gained through the use of my electric range, so that is why I call it my "Favorite Electrical Servant."

With it I am always sure of the best results and I not only find it clean and attractive, but economical as well.

Mrs. Geo. A. Seagrave,
P. O. Box 245, Uxbridge, Mass.

Relief from Back-Breaking Labor

What a relief from the back and heart-breaking labor of carrying wood, coal and ashes, from the dirt of soot and smoke, is the electric range with its clean, safe, economical heat at the turn of a switch. No fires to build and feed, but automatic cooking with a snowy-white electric range. A temperature of seventy-five in a pleasant kitchen on a hot day when it's ninety-five in the shade and a harvest crew for dinner. The first cost and the fuel expense of an electric range is no more than a coal range. Buy an electric range.

Miss Clarita O. Smith,
R. R. 2, Ellensburg,
Kittitas Co., Wash.

The Electric Range Again

My favorite electrical servant is my combination fuel-electric range.

Why? Because it is a health and sanity saver, it eliminates "rush" and worry. As a busy farm woman, I am sometimes detained outdoors with a baby, brooder stove, or some other "chore," beyond the time intended starting my meal, but the nerve-wracking "working against time" is entirely abolished by my priceless stove. Electricity is quick and sure. There is no dying down of the fire just when one needs a hot flame.

Many hesitate to buy an electric range thinking they are expensive to operate. I think not. Last month I used 187 k.w.h. This covers current used by milking machine, automatic pump, radio, iron, percolator and toaster, besides lighting house and barn and cooking for a family of eight.

Edith Gratias, Perkasie, Pa.
Route 2.

P. S.—I could say much of the convenience of the fuel attachment, but my word limit does not permit.

Enjoy Many Appliances

Your magazine comes to us every month and we have always found it full of new ideas and suggestions. We live in one of the many towns which have Associated Gas and Electric plants.

At the present time we have an electric washer, milking machine, iron, toaster, vacuum cleaner, battery charger and a corn popper. We certainly enjoy having every one of these appliances.

Mrs. L. E. Holcombe, Chateaugay, N. Y.